

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
15 September 2005 (15.09.2005)

PCT

(10) International Publication Number  
**WO 2005/085305 A1**

(51) International Patent Classification<sup>7</sup>: **C08F 110/06**,  
4/64

F-79170 Bressuire (FR). **RAZAVI, Abbas** [IR/BE]; 35,  
Domaine de la Brisée, B-7000 Mons (BE).

(21) International Application Number:  
PCT/EP2005/050859

(81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(22) International Filing Date: 1 March 2005 (01.03.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
04290571.1 2 March 2004 (02.03.2004) EP

(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(71) **Applicants** (*for all designated States except US*): **TOTAL PETROCHEMICALS RESEARCH FELUY** [BE/BE]; Zone Industrielle C, B-7181 Seneffe (Feluy) (BE). **CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE** [FR/FR]; 3, Rue Michel Ange, F-75016 Paris (FR).

**Published:**

— with international search report

(72) **Inventors; and**

(75) **Inventors/Applicants** (*for US only*): **LAVASTRE, Olivier** [FR/FR]; La Mazure, F-35490 Gahard (FR). **BONNETTE, Fabien** [FR/FR]; 26, Rue de Bel'Air,

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) **Title:** IONIC LIQUIDS FOR HETEROGENISING METALLOCENE CATALYSTS

(57) **Abstract:** The present invention discloses a method for preparing an heterogenised catalyst component comprising the steps of: a) providing a halogenated precursor component of formula (I)  $-X-[-CH_2-]_n-CH_3$  b) reacting the halogenated precursor with an ionic liquid precursor in a solvent to prepare an ionic liquid;  $IL^+X^-$  c) optionally, reacting the intermediate  $IL^+X^-$  with a salt  $C^+A^-$ , wherein  $C^+$  is a cation that can be selected from  $K^+$ ,  $Na^+$ ,  $NH_4^+$ , and  $A^-$  is an anion that can be selected from  $PF_6^-$ ,  $SbF_6^-$ ,  $BF_4^-$ ,  $(CF_3-SO_2)_2N^-$ ,  $ClO_4^-$ ,  $CF_3SO_3^-$ ,  $NO_3^-$  or  $CF_3CO_2^-$ . d) using the ionic liquid prepared in step b) to heterogenise a metallocene component of formula (II)  $R''(CpR^m)(Cp'R^n)MQ_2$  wherein Cp and Cp' are independently selected from substituted or unsubstituted cyclopentadienyl groups M is a metal selected from Group 4 of the Periodic Table, R'' is a structural bridge imparting stereorigidity between Cp and Cp' and Q is a halogen or an alkyl having from 1 to 12 carbon atoms; e) heterogenising the ionic liquid/metal system by addition of an apolar solvent inducing the precipitation reaction; f) retrieving a metallocene catalyst component heterogenised by an ionic liquid. It also discloses an active catalyst system heterogenised by an ionic liquid and its use in the polymerisation of olefins.



WO 2005/085305 A1